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(54) Apparatus for Separating
 Conjoined Articles and Transporting
 the Articles

(57) Apparatus for separating
 conjoined articles e.g. skinpacks and
 transporting them comprises a
 carriage (5) which is displaceable in
 direction of advance of a web 3

containing the articles and which
 carries a clamping device (11) and a
 cutting element in the form of a
 transversely extending, lowerable
 serrated knife (9). The knife
 cooperates with a groove (13), in a
 base 12 provided on the carriage. The
 clamping device 11 is adapted to grip
 and feed the web after the cut has
 been made.

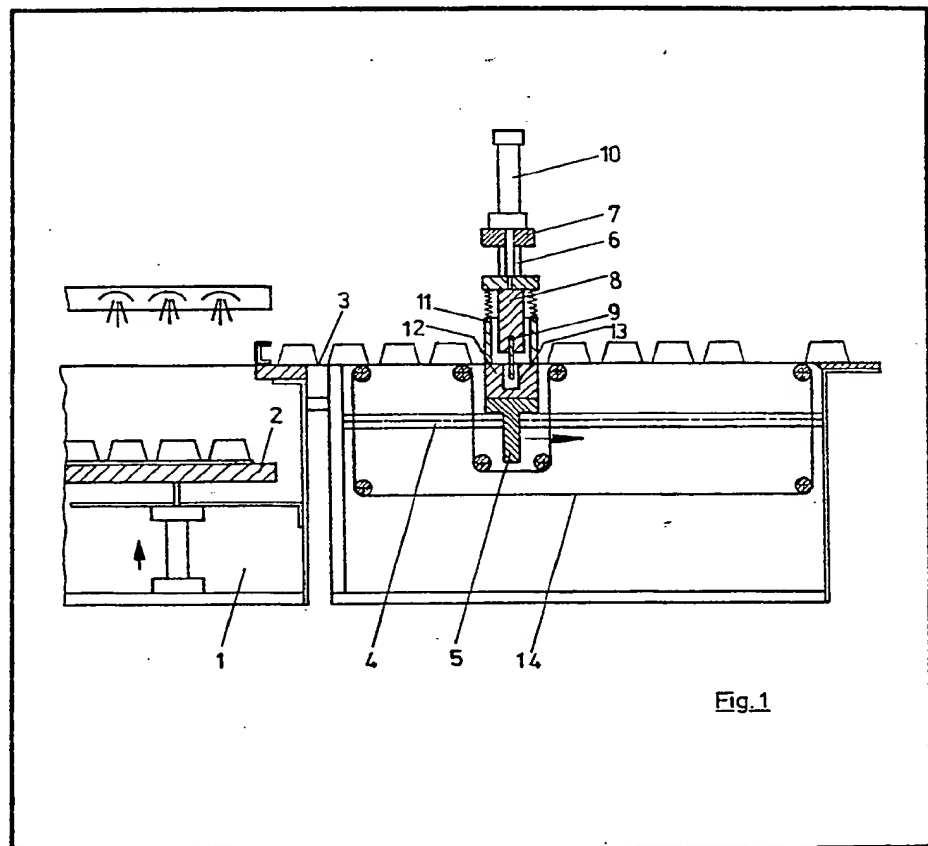


Fig.1

GB 2 042 962 A

A detailed technical drawing of a mechanical assembly, likely a mold or a testing apparatus. The drawing is divided into two main sections: a side view on the left and a cross-sectional view on the right. The side view shows a base (1) with a vertical support (2) and a horizontal plate (3) with several rectangular blocks (4) on top. The cross-sectional view shows a similar base (1) with a vertical support (2) and a horizontal plate (3) with several rectangular blocks (4) on top. A central vertical rod (10) passes through the assembly, with various components (5, 6, 7, 8, 9, 11, 12, 13, 14) and springs (11, 12) integrated into its structure. The drawing uses standard engineering conventions, including hatching for different materials and arrows to indicate movement or force.

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SPECIFICATION

Apparatus for Separating Conjoined Articles and Transporting the Articles

The present invention relates to apparatus for separating conjoined articles downstream of a packaging machine and transporting the articles, such a machine being, for example, an intermittently operable 'skinpack' machine, to which are fed a web of film from a roll and individual cardboard sections with articles to be packaged lying thereon, or a thermal moulding machine which deforms a web of film section by section.

Apparatus for the onward transport of a packaged product and for separating such products by longitudinal and transverse cuts, are disclosed in, for example, German (Fed. Rep.) patent specification No. 23 51 069 and Utility Model No. 75 23 267.

In the apparatus according to German patent specification No. 23 51 069, a holding-down device has a groove in which a cutting blade is displaced transversely to the direction of advance. Consequently, two drives are necessary, one for the motion of the holding-down device and one for the motion of the knife. Since the cutting of the entire width of a film is undertaken by the same part of the knife, this becomes blunt relatively rapidly and must be changed, which necessitates stopping of the automatic machine.

The transverse cutting disclosed in German Utility Model No. 75 23 267 provides a shearing cut with a sprung holding-down device. Thus requiring only one drive. It is a disadvantage of the shearing cut, however, that exact setting of the upper blade relative to the lower blade in respect of the cutting gap is necessary for cutting thin plastics film. This must be nearly zero, as otherwise there is the danger that the thin film is not cut, but drawn into the gap. The slight cutting gap, however, has a disadvantageous effect on the working life of the knife. Since two hardened knives with sharp edge are needed, the transverse cutter is relatively expensive, and cost is increased due to the need to provide for setting of the lower blade relative to the upper blade.

According to the present invention there is provided an apparatus for separating conjoined articles downstream of a packaging machine and transporting the articles, the apparatus comprising means defining a conveying path for the articles, a carriage mounted to be displaceable in a given direction of conveying of articles along the conveying path, a cutting element mounted on the carriage to extend transversely of the conveying path and lowerable to cut between and thereby separate articles on the path, a base element associated with the carriage and provided with an elongate recess arranged to receive the cutting element centrally therealong, the width of the recess being greater than the thickness of the cutting element, and resilient clamping means carried by the carriage

and operable to clamp portions of separated articles on either side of the cutting element.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is a schematic longitudinal sectional view of apparatus according to the said embodiment, and

Fig. 2 is an elevation of a transverse cutting knife of the apparatus.

Referring now to the drawings, there is shown apparatus for separating conjoined articles and transporting the articles, the apparatus being arranged downstream of a 'skinpack' machine 1 or a thermal moulding machine. In the case of skinpackaging, a piece of cardboard with articles to be packaged is placed on a table 2 of the machine. A length of plastics material drawn from a roll is clamped in a moulding station of the machine, heated and skinpacks are then produced in a known manner and transported or conjoined as a strip or band 3.

In the case of a thermal moulding machine rather than the machine 1, this also has a table, on which the moulds are then fastened and the onward transport after a completed moulding operation takes place with the articles conjoined as a strip.

The apparatus embodying the invention takes over the transport of the articles and severs each of these from the strip 3. The apparatus comprises a carriage 5 displaceable on guides 4, upwardly extending guides 6, which are connected by a crosshead 7, and a knife carrier 8 vertically displaceable on the guides 6. A pneumatic piston-cylinder unit 10 serves for the movement of the knife carrier 8, which carries a serrated knife 9. Arranged on both sides of the knife carrier 8 is a spring-mounted holding-down device 11, which protrudes beyond the lower edge of the knife 9 when the carrier 8 is raised. When the carrier is lowered, the device 11 contacts the matrix 12 and then, during further lowering of the carriage, moves relative to the knife 9 and above the knife lower edge as shown in Fig. 1.

The matrix 12 has a groove 13, which receives the knife 9 and the width of which is greater than the thickness of the knife 9, so that a gap in the order of 0.5 to 1.5 millimetres is present on either side of the knife 9 when received in the groove. The matrix does not have to be hardened; the edges need not be ground. Cutting is effected solely by the knife, which serves through the film clamped between device 11 and matrix 12.

Advantageously, the cutting edge of the knife 9 extends at an angle, so that the cutting takes place as drawing cut (see Fig. 2).

A circulating transport belt 14 serves for the support of the strip 3 and of the severed articles. The belt is stationary when the carriage 5 moves to the left, but runs when the carriage 5 travels to the right. There is thus no relative displacement between the belt 14 and the strip 3.

In operation, a strip 3 of articles is disposed between the machine 1 and the apparatus. After the severing of the preceding article, the knife 9 remains in the lowered setting, as illustrated, so that both the start of the strip 3 as well as the end of the previously severed article is clamped between the device 11 and the matrix 12. The carriage 5 is now moved to the right through the length of one article by means of a drive (not shown). In this movement, the carriage draws the article out of the moulding station of the machine 1. Then, the knife 9 and the device 11 move upwardly and, while the next operating cycle runs through in the machine 1, the carriage 5 moves through the length of one article to the left, remains there, the knife 9 moves downwardly, the device 11 clamps the strip 3 and the next article is severed. The operation is then repeated. The device 11 exercises both the function of the retention of the film during severing and the function of clamping during onward transport of the articles.

The cut edges of the articles are not of course, of the quality obtained by a shearing cut. As a rule, however, the articles are further processed, for example in a punching machine, and the cut edges are left as waste.

Claims

1. Apparatus for separating conjoined articles

30 downstream of a packaging machine and transporting the articles, the apparatus comprising means defining a conveying path for the articles, a carriage mounted to be displaceable in a given direction of conveying of articles along the conveying path, a cutting element mounted on the carriage to extend transversely of the conveying path and lowerable to cut between and thereby separate articles on the path, a base element associated with the carriage and provided with an elongate recess arranged to receive the cutting element centrally therealong, the width of the recess being greater than the thickness of the cutting element, and resilient clamping means carried by the carriage and operable to clamp portions of separated articles on either side of the cutting element.

2. Apparatus as claimed in claim 1, wherein the cutting element comprises a knife with a serrated cutting edge.

50 3. Apparatus as claimed in claim 2, wherein the cutting edge extends at an angle to the general plane of the conveying path.

4. Apparatus for separating conjoined articles downstream of a packaging machine and transporting the articles, the apparatus being substantially as hereinbefore described with reference to the accompanying drawings.